[0015] To illustrate further, contaminants may interfere with the connection between the connector in a mobile device and connector in a cable. The contaminants may cause a high series resistance in the connection. With power flowing through the cable from a device such as a charger to a mobile device, the high-resistance series resistance due to the contaminants may dissipate enough power to cause the connector materials to heat to the point of melting. A thermal sensing connector may cause one or more electrical contacts in the connector to become inactive thereby reducing or eliminating the continued thermal rise in the connector.

[0016] Devices, such as a mobile device and a charging device, may not have thermal sensing connectors. However, the overheating problems described above (as well as others) may be mitigated, in some example embodiments, with a cable that includes thermal sensing connectors. When the cable includes thermal sensing connectors, even though the electronic devices attached to each end of the cable do not have thermal sensing connectors, the cable does. Because the device connectors mated with the cable connectors may be in close proximity as they would need to be in order to make electrical contact, the electronic device connector and cable connector may also be thermally connected. If the temperature rises in the device connector mated to the cable connector, the thermal sensing connector in the cable may cause one or more electrical contacts in the connector to become inactive thereby reducing or eliminating the continued thermal rise in the connector.

[0017] In some example embodiments, a thermal sensing connector in a mobile device may protect the mobile device from overheating at the connector. In some example embodiments, a thermal sensing connector in an accessory device such as a charger may protect the accessory device from overheating at the connector. In some example embodiments, a thermal sensing connector built into a cable that interconnects a mobile device to an accessory device may protect the mobile device and/or accessory device from overheating at the connectors. In some example embodiments, a thermal sensing component placed at locations along the length of a cable may protect the cable and/or devices from overheating.

[0018] FIG. **1** depicts an example of a system including thermal sensing connectors and a thermal sensing cable, in accordance with some example embodiments. A first apparatus **110** may include a thermal sensing connector **112**, and a second apparatus **130** may include a thermal sensing connector. Cable **120** may provide an electrical connection between the first apparatus **110** and second apparatus **130**.

[0019] First apparatus **110** may be any type of electronic apparatus such as a charging device, a mobile device, a computer, and the like. For example, apparatus **110** may be a charging device such as a wall powered alternating-current (AC) to direct-current (DC) converter designed to supply power through a cable such as cable **120** to a second apparatus such as second apparatus **130**. The first apparatus **110** may include a thermal sensing connector **112**. The thermal sensing connector may cause disconnection of one or more contacts in the connector at and above a predetermined temperature inside the connector. The predetermined temperature may be selected by the design of the connector. The temperature may be selected to be low enough to prevent damage to the materials on the connector and attached cable as well as being selected so that the exterior does not reach a temperature that could injury to a person touching the connector.

[0020] Thermal sensing connector **112** may be designed to include one or more of a one-time thermal fuse, a bi-metallic thermal circuit breaker with automatic or manual recovery, a negative temperature coefficient (NTC) thermal sensing resistor, a positive temperature coefficient (PTC) resettable fuse, an electrical switch, a transistor, a mechanical switch, a non-resettable fuse, an electrically resettable fuse, a manually resettable fuse, and/or a PTC thermistor as the protective element **210**. PTC resettable fuses may be referred to as resettable fuses, polyfuses, or polyswitches. The thermal sensing connector **112** may also include one or more diodes and transistors as the thermal sensing element **210**. If the thermal sensing connector **112** rises to or above a predetermined value, the connector causes disconnection of one or more electrical connections inside the connector. In some example embodiments, the thermal sensing connector **112** sends a signal to the connected electronic device to cause one or more connections inside the connector **112** to become inactive causing the temperature to fall. For example, the thermal sensing connector **112** may provide an indication of, or send a signal to, apparatus **110** indicating the temperature is at or above the predetermined value. Apparatus **110** may disconnect via a transistor or other switching device in apparatus **110** a power source from apparatus **130** to cause the temperature in connector **112** to drop.

[0021] Second apparatus **130** may also have a thermal sensing connector **112** similar to the first apparatus **110**, or the thermal sensing connector in apparatus **112** may utilize a different thermal sensing method than the method used at apparatus **110**. Apparatus **130** may be any type of electronic apparatus listed above. Continuing the example above, the first apparatus **110** may be a charger. The second apparatus **130** may be, for example, a mobile phone that includes a battery. The first apparatus may charge the battery in second apparatus **130** through a cable such as cable **120**.

[0022] In some example embodiments, cable **120** may include standard connectors that have no thermal sensing ability. Thermal sensing connectors in first apparatus **110** and/or second apparatus **130** may protect both ends of the cable from overheating. In some example embodiments, cable **120** may include thermal sensing connectors and the first apparatus and/or second apparatus may also include thermal sensing connectors. Thus, first apparatus **110** may include a thermal sensing connector and cable **120** connected to first apparatus **110** may also include a thermal sensing connector **112**. Second apparatus **130** may include a thermal sensing connector and cable **120** connected to second apparatus **130** may also include a thermal sensing connector **112**. In some example embodiments, first apparatus **110** and/or second apparatus **130** may include standard connectors that are not thermal sensing. In this case, cable **120** may include at least one thermal sensing connector **112** that protects first apparatus **110** and/or second apparatus **130** from thermal damage.

[0023] In some example embodiments, cable **120** may include thermal sensing structures in the cable with thermal sensing structures placed at one or more locations along the length of the cable. This arrangement may protect the cable itself from overheating due to excessive power being passed through the cable. For example, if the cable were to be short-circuited, a high current passed through the cable could cause overheating depending on the gauge of the wire in the cable.

[0024] FIG. **2** depicts an example of a system including thermal sensing connectors and a cable including thermal